CLAIMS

We claim:

1. An aluminate phosphor having at least a partial spinel coating formulated to have a general formula $Mg_{1-x}Al_{2(1-y)}O_{4-3y-x}$, where $0 \leq x < 1$ and $0 \leq y < 1$.

2. The phosphor of claim 1 wherein $x=0$ and $0 \leq y \leq 2/3$.

3. The phosphor of claim 1 wherein x is 0 and y is about 0.5.

4. The phosphor of claim 1 wherein the phosphor is a barium magnesium aluminate activated with divalent europium.

5. The phosphor of claim 4 wherein $x=0$ and $0 \leq y \leq 2/3$.

6. The phosphor of claim 4 wherein x is 0 and y is about 0.5.

7. The phosphor of claim 1 wherein the phosphor has a brightness greater than the same phosphor without the coating after both phosphors have been heated in air under the same conditions.

8. The phosphor of claim 4 wherein the brightness of the phosphor is at least about 10% greater than the brightness of the same phosphor without the coating after both phosphors have heated in air at 600°C for 30 minutes.

9. The phosphor of claim 1 wherein the phosphor retains a larger percentage of its initial brightness compared to the percentage of initial brightness retained by the same phosphor without the coating after both phosphors have been subjected to exposure to UV radiation at about 190 nm under the same conditions.

10. The phosphor of claim 4 wherein the phosphor retains more than about 50% of its initial brightness after exposure to UV radiation at about 190 nm for 4.5 hours at a power density of $7.5W/cm^2$.

11. The phosphor of claim 10 wherein the phosphor retains more than about 60% of its initial brightness.

12. A method of applying at least a partial spinel coating on an aluminate phosphor comprising the steps of:

(a) combining an aqueous solution of coating precursors and an aluminate phosphor, the aqueous solution formulated to yield a spinel coating having a general formula $Mg_{1-x}Al_{2(1-y)}O_{4-3y-x}$, where $0 \leq x < 1$ and $0 \leq y < 1$;

(b) drying the aqueous solution containing the phosphor; and

(c) firing the phosphor to form the at least partial coating.

13. The method of claim 12 wherein the coating precursors are nitrates and step c) comprises firing the phosphor in air to

remove the nitrate groups followed by a firing in a reducing atmosphere.

14. The method of claim 13 wherein the firing in air is performed at 600°C for 30 minutes and the firing in the reducing atmosphere is performed in a (5% H_2)-N_2 atmosphere at 1200°C for 90 minutes.

15. The method of claim 14 wherein the phosphor is a barium magnesium aluminate phosphor activated with divalent europium.

16. The method of claim 15 wherein the coating precursors are hydrated nitrates of magnesium and aluminum.

17. The method of claim 12 wherein $x=0$ and $0 \leq y \leq 2/3$.

18. The method of claim 12 wherein x is 0 and y is about 0.5.

19. The method of claim 16 wherein $x=0$ and $0 \leq y \leq 2/3$.

20. A method of applying at least a partial spinel coating on an aluminate phosphor comprising the steps of:

(a) dissolving aluminum and magnesium nitrates in a minimum amount of water at about 90°C to form an aqueous solution, the solution being formulated to yield a spinel coating having a general formula $Mg_{1-x}Al_{2(1-y)}O_{4-3y-x}$, where $0 \leq x < 1$ and $0 \leq y \leq 2/3$;

(b) combining the dissolved nitrates with an aluminate phosphor to form a phosphor slurry;

c) drying the phosphor slurry and firing the dried phosphor in air at 400°C for 2 to 3 hours; and

d) subjecting the phosphor to a flash firing in a reducing atmosphere at about 900°C.